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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,873	09/25/2001	Rony A. Abovitz	4204.6-2	9194

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EXAMINER	
KRONENTHAL, CRAIG W	

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 07/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/963,873	ABOVITZ ET AL.	
	Examiner	Art Unit	
	Craig W. Kronenthal	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 February 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) *5 and 10* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-9* is/are rejected.

7)☒ Claim(s) *3* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 March 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed February 9, 2005, has been entered and made of record.

Response to Arguments

2. Applicant's arguments with respect to claim 1, 2, 3, 7, and 8 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claim 3 is objected to because of the following informalities:

- On line 2 of claim 3, "includes" should be replaced with "include."

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4 and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haim et al. (WO 98/35720) in view of Cosman (PN 6,405,072). (hereinafter Haim and Cosman respectively)

Regarding Claims 1: Haim discloses a registration artifact (Figure 1B, item 20) for use in registering fluoroscopic images (Figure 3, item 60 and Figure 4, item 80) comprising:

- A plurality of radio-opaque fiducials (Figure 1B, items 22a, 22b, 22c) embedded in a radio-transparent support structure (Figure 1B, item 26) in a known geometric relationship [The fiducial marks (22a, 22b, 22c) because they are made from metal are radio-opaque (p. 20 lines 4-6 and 10-12).].

Haim does not disclose optically trackable markers. However, Cosman discloses an apparatus for registering medical images comprising:

- A plurality of spatially and optically trackable markers (Figure 1, items 20, 21, 23, 24 and Figure 2, item 56) depending from the support structure (Figure 2, 55) in a known geometric relationship to fiducials (tattoo or ink marks) [The markers (20, 21, 23, 24) are spatially and optically trackable (col. 4 lines 34-42). These markers in one embodiment correspond to the raised spheres (56) depending from a plate structure (55). Furthermore, the plate (55) is adhered to the patient such that it has a known geometric relationship with radio-opaque tattoos or ink marks (col. 9 lines 7-11).].

It would have been obvious to one of ordinary skill in the art to modify Haim's magnetically trackable markers (Figure 1B, item 24 and Figure 2, item 40) with

Cosman's optically trackable markers (20, 21, 23, 24) to perform the position and orientation determination. In addition, the change to optical markers would necessitate a change in the tracking system. Therefore, Cosman's camera system (Figure 1, item C (including cameras 17, 18, 19 and light source 16)) and optical image tracking processor (Figure 1, item 34) would replace Haim's magnetic field generator coils (Figure 2, item 42) and computer (48), respectively. Furthermore, Haim suggests that the coordinate sensing device, which as disclosed utilizes magnetic tracking, could also employ sensors based on optical principles as disclosed by Cosman (p. 6 lines 21-23).

Regarding Claims 2 and 7: Haim discloses a method for registering fluoroscopic images comprising:

- Capturing with a fluoroscope a first fluoroscopic image (Figure 3, item 60) of a patient (Figure 2, item 32) and a registration artifact (Figure 2, item 20) from a first perspective, the registration artifact including, a plurality of radio-opaque fiducials arranged in a known geometric relationship and a plurality of optically trackable markers disposed in a known geometric relationship to fiducials [A first fluoroscopic image (60) is taken from a lateral perspective (p. 22 lines 16-26).];
- Determining the position of the registration artifact in the first fluoroscopic image with respect to a known coordinate frame by determining the position of the optically trackable markers using a tracking system, the tracking system being separate from the patient and the flouroscope [Haim teaches using the 2-D coordinates of the points 62a, 62b, 62c, and 63 on the fluoroscopic image (60),

corresponding to the fiducial marks 22a, 22b, 22c, and 23, to calculate the position of the element (20) (p. 22 lines 16-22). The relative coordinates of 62a, 62b, 62c, and 63 are compared with the known corresponding positions determined by a tracking system computer (Figure 3, item 48) (p. 22 lines 22-29). However, Haim's tracking system is magnetic as opposed to optical. Cosman discloses an optical image tracking processor (Figure 1, item 34), capable of determining 3-D positional data of the markers (20, 21, 23, 24), which replaces Haim's magnetic tracking (Cosman, col. 5 lines 8-18).];

- Capturing a second fluoroscopic image of the patient and the registration artifact from a second perspective [A renewed fluoroscopic image (60) is taken at a different view angle (p. 23 line 28 – p. 24 line 2).];
- Determining the position of the registration artifact in the second fluoroscopic image with respect to the known coordinate frame by determining the position of the markers using the tracking system [The coordinates are re-registered and transformed in the same manner as the first fluoroscopic image (p. 23 line 31 – p. 24 line 2).];
- Registering the first and second fluoroscopic images using the positions of the fiducials in each fluoroscopic image and the determined position of the registration artifact [The fiducial marks 22 and 23 are used to register multiple CT images (p. 24 lines 19-31).

The analogous arguments with respect to claim 2 are applicable to claim 7.

Regarding Claims 3 and 8: Cosman discloses the registration artifact of claim 1, wherein the optically trackable markers include an infrared emitting diode (IRED) [Cosman discloses the markers (Figure 1, items 20, 21, 23, 24) being LED emitters (col 4 lines 39-41). In addition, Cosman discloses that the markers (20, 21, 23, 24) could also be reflectors of infrared light (col. 4 lines 25-28). Although Cosman does not expressly disclose the markers to be IREDs it would be obvious to one of ordinary skill in the art to use IREDs as a type of LED emitter.].

The analogous arguments with respect to claim 3 are applicable to claim 8.

Regarding Claims 4 and 9: Cosman discloses the registration artifact of claim 1, wherein the optically trackable marker includes a reflective sphere to reflect infrared radiation [Cosman teaches that the markers (Figure 1, items 20,21,23,24) could be reflective spheres (col. 4 lines 39-42) and that the source of light (Figure 1, item 16) they would reflect could be infrared (col. 4 lines 25-28).].

The analogous arguments with respect to claim 4 are applicable to claim 9.

Regarding Claim 6: Haim discloses the registration artifact of claim 1, further comprising a radio-transparent body to which the plurality of fiducials and plurality of spatially and optically trackable markers are mounted [Haim discloses the radio-transparent body to be a disc of plastic material (Figure 1B, item 26) (p. 20 lines 4-5). The spatially and magnetically trackable markers (Figure 1B, item 24 and Figure 2, item 40), which are on a tool such as a needle (36), are mounted using indentations (Figure

1B, item 27) on the disc (26) (p. 20 lines 26-29). As explained with respect to claim 1, it would have been obvious to replace the magnetically trackable markers of Haim with Cosman's optically trackable markers.].

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig W. Kronenthal whose telephone number is (571) 272-7422. The examiner can normally be reached on 8:00 am - 5:00 pm / Mon. - Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (571) 272-7414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

06/28/05
CWK

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